most nearly attaining the conditions set forth above. The changed character of traffic, however, has demonstrated beyond doubt that an ordinary water-bound macadam road cannot successfully withstand the raveling action of a considerable amount of heavy and fast motor traffic. The per cent of motor traffic on the through highways is about three-fourths of the total amount.

In order that the economic advantages of the water-bound macadam road might still be retained, and that the roads of that type already built might not be a total loss, recourse was had to treating the road surface with bituminous materials to bind the stone together, rather than to adopting some entirely new and more expensive type of construction. Experiments along this line have developed two general methods of applying the bitumen to the surface stone which have been largely followed in this country, one known as the *penetration method* and the other as the *mixing method.* In the penetration method, which is the one treated in this article, the bitumen is incorporated with the mineral aggregate by applying it on the top of the road after the stone has been laid and allowing it to run into, or penetrate, the voids in the stone. By the mixing method the bitumen is incorporated with the stone before it is placed on the road. In both cases it is considered sufficient to incorporate the bitumen with only the upper two or three inches of broken stone, constituting what is known as the wearing surface.

There has been a great deal of controversy between engineers as to the relative merits of the bituminous macadam as built by the two methods of construction, but a comparison of the two will not be entered into extensively here as it is believed each is suitable for a character of traffic which the other is not. The mixing method, which is relatively expensive, is a satisfactory substitute for the asphalt pavement in cities where the traffic is very dense; while the penetration method, which is much less expensive than the former, is the type for the main country highways, where the traffic will average from 100 to 300 vehicles per day of which 75% may be motor traffic.

There are some who would abandon the penetration method entirely because there have been a few failures of roads of this